5 **ELECTRONIC PROGRAM GUIDE FEATURE FOR AV SYSTEM**

CROSS REFERENCE TO RELATED APPLICATIONS

This application is a Divisional of U.S. Serial No. 09/370,048 filed 8/6/1999, entitled "ELECTRONIC PROGRAM GUIDE FEATURE FOR AV SYSTEM" which is hereby incorporated by reference.

BACKGROUND OF THE INVENTION

10   Printed television program guides can provide viewers with program information in a grid format. Specifically, in printed television program guides, the channel numbers are arranged along the vertical axis, the times are arranged along the horizontal axis, and the programs are listed in the cross sections of the channel axis and the time axis. Many printed television program guides also

15   list programs alphabetically. Recently developed electronic program guides (EPG), in addition to having the features provided by the printed television program guides, also allow viewers to search a program database according to key words, such as the names of the actors, title, theme (drama, sports, news,), etc. Such EPGs have utility not just in televisions, but in all audio-visual

20   (AV) systems, which can include TVs, videocassette recorders (VCRs), AV amplifiers, or even personal computers.

While existing EPGs can provide viewers with information about current and future programs, they are unable to provide information about the previous programs. This can be inconvenient to viewers. For example, if a viewer was

25   unable to watch one or more previous episodes of a program, it is difficult for the viewer to follow the current episode. Some viewers may tape the episodes of a program they are unable to watch live. However, to know the gist of the recorded episodes, the viewers have to go through the tapes, and they often do not have time to do so before watching the current episode of the program. To

30   these viewers, it would be desirable to display the description of the previous episodes of the program before watching the episode or while watching the current episode.

5   There is, therefore, a need for an improved EPG for an AV system that maintains the history information about the previous episodes of a program.

There is another need for an improved EPG for an AV system that can interactively display the history information about the previous episodes of a program.

10   There is yet a further need for an improved EPG for an AV system that can interactively display the history information about the previous episodes of a program while the current episode is being displayed on the audio-visual system.

The present invention provides an improved EPG for an AV system to 15 meet these needs.

SUMMARY OF THE INVENTION

To overcome the shortcomings in the available art, the present invention provides a novel method for displaying information on a AV system by receiving 20 history information in electronic form regarding a program, storing the history information in the AV system, and interactively displaying the history information on the AV system at a distant future time, e.g., a few days later. Preferably, the history information includes a description of the program.

Where the program includes a plurality of episodes, the method includes 25 receiving history information in electronic form by means of the AV system regarding a previous one of the episodes of the program, storing the history information for the previous episode in the AV system, receiving by means of the AV system a current episode at a time subsequent to the previous episode, and displaying, for a viewer of the AV system, the history information for the 30 previous episode. The current episode may be displayed on the AV system while the history information for the previous episode is also being displayed on the AV system. The history information can include a description of the previous episode.

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5   Another embodiment of the inv ntion is a method for receiving and
displaying history information on a AV system regarding a program having a
plurality of episodes and includes the steps of receiving both a broadcast of a
particular episode of the program and history information, in electronic form,
regarding the particular episode, determining whether any previous episodes of
10   the program were stored in the AV system, and, if any previous episodes were
stored in the AV system, automatically storing the history information for the
particular episode in the AV system. In this embodiment, a current one of the
episodes is received at a time subsequent to receiving the particular episode and
the history information for the particular episode is displayed on the AV system.
15   Further included can be the step of displaying the current episode on the AV
system, while the history information regarding the particular episode is being
displayed on the AV system. In this embodiment, the history information
includes a description of the particular episode.

The invention is also embodied in an apparatus for displaying information
20   on a AV system, comprising a receiver for receiving history information in
electronic form regarding a program, a display screen, a memory for storing the
history information, a controller for controlling the receiver, the display screen,
and the memory, and a user activated controller for interactively causing the
controller to display the history information on the display screen at a time
25   chosen by the user. Preferably, the history information is a description of the
program.

Where the program has a plurality of episodes, the apparatus according to
the invention includes a receiver for receiving history information in electronic
form by means of the AV system regarding a previous one of the episodes of
30   the program and including receiving a current episode at a time subsequent to
the previous episode, a memory for storing the history information for the
previous episode in the AV system, a display screen for selectively displaying,
for a viewer of the AV system, the history information for the previous episode,

5   and a controller for controlling the receiver, the memory and the display screen. The controller preferably causes the display screen to display the current episode on the display screen while the history information for the previous episode is also being displayed on the display screen. The history information includes a description of the previous episode.

10   Still another embodiment of the invention is an apparatus for receiving and displaying history information on a AV system regarding a program having a plurality of episodes, comprising a receiver for receiving both a broadcast of a particular episode of the program and history information, in electronic form, regarding the particular episode, a display screen for displaying the program and

15   the history information, a memory for storing the received history information, and a controller for controlling the receiver, the display screen and the memory. The controller determines whether any previous episodes of the program were stored in the AV system, and, if any previous episodes were stored in the AV system automatically stores the history information for the particular episode in

20   the memory. When the receiver receives a current one of the episodes, the controller can cause the display screen to display the history information for a previous episode. The controller also can also cause the display screen to display the current episode while the history information regarding the particular episode is being displayed on the display screen. The history information

25   includes a description of the particular episode.

In the preferred embodiments, the AV system is a television system.

The present invention further encompasses an electronic program guide (EPG) circuit which includes an EPG processor circuit, including a central processing unit (CPU), supplied with a video signal input, a horizontal sync

30   input, and a vertical sync input. The video signal input includes EPG program information in electronic form describing viewable programs which is extracted from the video signal by the EPG processor circuit. The EPG circuit further includes a read only memory (ROM) connected to the EPG processor circuit for

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5   storing a program used by th EPG's CPU, and a random access memory

supplied with the EPG program information by the EPG processor circuit, for

storing EPG program information for a plurality of episodes of a given program.

The EPG can further include a non-volatile memory for storing user specific

information pertaining to the EPG circuit.

10   The EPG processor circuit outputs an on screen display (OSD) signal for

displaying the history information of a selected episode of a program.

The EPG program information can be derived from any suitable source. It

can be extended data service data contained in the vertical blanking interval of

the video signal or a cable system's out of band (OOB) data stream. Where the

15   video signal is a digital signal, the EPG program information is in the digital

signal's program specific information protocol (PSIP). The EPG program

information can also be received via the Internet or a public switched telephone

network.

20   BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other objectives, features and advantages of the

invention will be more readily understood upon consideration of the following

detailed description of certain preferred embodiments of the invention, taken in

conjunction with the accompanying drawings.

25   Figure 1 shows an audio-visual system, in accordance with the present

invention.

Figure 2 shows the EPG (electronic program guide) of Figure 1 in detail, in

accordance with the present invention.

Figure 3 shows a flowchart illustrating a process of displaying history

30   information for the episodes of a program that are previously broadcast, in

accordance with the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

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5   To overcome the shortcomings in the existing art, the present invention provides a novel method and apparatus for displaying program history information on an AV system.

Figure 1 shows an audio-visual system 100, in accordance with the present invention. It is to be understood that the audio-visual system 100 is

10   merely one example of an AV system in which the EPG circuit of the present invention could suitably be used. Other suitable AV systems can include videocassette recorders (VCRs), AV amplifiers, or even personal computers.

As shown in Figure 1, the audio-visual system 100 includes a tuner (receiver) 108 coupled to a signal input 106, which can be a TV antenna, a

15   cable or satellite TV system, or an Internet feed, an audio-video (AV) switcher 110 receiving an output from the tuner 108, an audio processor 112 which receives an audio output from the AV switcher 110, a video processor 114 which receives a video output from the AV switcher 110, and an electronic program guide (EPG) circuit 116 which receives an AV output from the tuner

20   108. A speaker 118 is connected to reproduce the audio output of the audio processor 112 and a cathode ray tube (CRT) 120 is connected to reproduce the video output of the video processor 114. The video processor 114 controls a vertical and horizontal deflection circuit 122 for the CRT 120. In the preferred embodiment, a video cassette recorder (VCR) 130 is supplied with an AV

25   output of the tuner 108 for recording programs under viewer control and outputs a reproduced AV signal to the AV switcher 110. A host processor 126 controls all of the above-described elements, including programming for the VCR 130.

A remote control signal receiving circuit 124 is connected to provide an

30   output to the host processor 126. A remote controller 128 communicates with the audio-visual system 100 via the control signal receiving circuit 124. The remoter controller 128 comprises a plurality of control buttons (including "Yes" and a "No" buttons) that can be selected by a viewer. In response to a

5   selection of any one of the buttons, the remoter controller 128 sends a control
signal to the control signal receiving circuit 124. Upon receiving the control
signal, the control signal receiving circuit 124 sends the control signal to the
host processor 126. In response, the host processor 126 controls the operation
of the audio-visual system 100 according to the nature of the control signal.

10   Figure 2 shows the EPG circuit 116 of Figure 1 in detail, in accordance
with the present invention. The EPG circuit 116 comprises a RAM (random
access memory) 208, an EPG processor 210, a ROM 212 (read only memory)
for storing the program for the EPG, and an electronically erasable program
read-only memory (EEPROM) 214. The processor 210 controls all of the

15   elements of Fig. 2.

The EEPROM 214 contains information that must not be lost even if
backup power fails or if the TV set is disconnected from the AC power line for
an extended period, i.e., longer than a battery back up is capable of supplying
power. Such information might be any data that the system has stored

20   regarding the user's set-up information, e.g., whether there is there a cable box,
the user's zip code and time zone, whether daylight savings is used, and what
programs are scheduled for recording on the VCR 130.

The RAM 208 can be conventional flash memory or, more suitably, static
RAM (SRAM) which will maintain information even after power is removed from

25   the audio-visual system provided a small voltage is maintained for the RAM
208, such as by a small battery, a charged capacitor, or the like. RAM 208
could also be a very fast hard disk drive (HDD). RAM 208 stores a database of
the program related information, including information for as many as 100 or
more channels, with data going forward in time by as much as several weeks.

30   Each channel requires storage of data pertaining to program titles, description,
channel numbering, and so-called V blocking (parental censorship capability).
Other data may be stored as well. This data must be maintained for each
program at each hour for each channel. Additionally, the RAM 208 stores a

5   short history for at least a limited number of channels that the EPG system 116 knows that the user normally watches. As will be explained further herein, this is made possible by the fact that the EPG system 116 knows what channels the viewer prefers to watch either through previous VCR 130 programming requests or even via normal viewing habits.

10   Most of the information stored in the RAM 208 is referred to herein as program history information, which is obtained from any arbitrary signal source containing the EPG information. This can be a low speed data stream called the extended data service (XDS) carried in line 21 of field 1 and line 22 of field 2 of NTSC signal programs. This occurs in the vertical blanking interval (VBI), which

15   is lines 1-21 of field 1 and lines 1-22 of field 2 of an NTSC signal. The data could also be obtained from a proprietary source, such as GemStar, or in a digital TV signal's Program Specific Information Protocol (PSIP), via a telco modem, a pager modem, a cable system's Out of Band (OOB) data stream, or over the Internet if the audio-visual system is suitably connected to the Internet.

20   The information could also be derived from a satellite receiver. In a typical EPG system, such as GemStar, the main program description, etc., is sent during a master EPG data base download at a pre determined time several times during the night.

    In the embodiment illustrated in the present application, the EPG circuit

25   116 gets the program information from the XDS low speed data stream carried in line 21 of field 1 and line 22 of field 2 of NTSC signal programs. It obtains this information from the video-input signal from the AV switcher 110 using the horizontal and vertical sync signals obtained from the video processor 114.

    The RAM 208 maintains a history log 209 for storing the history

30   information for the previous episodes of programs selected by the viewer. This history information might store, for example, a brief description of the plot, actors, theme, etc. of a particular program. Where the program is one episode of a plurality of episodes of a continuing program, the history might further

5   describe the general theme of the program, e.g., a detective series staring a particular character acted by a particular actor and further describe the salient events which take place in that particular episode.

The processor 210 follows a program stored in the ROM 212 and reads data from, and stores data in, the RAM 208 and EEPROM 214. The processor

10   210 also supplies the program guide information as RGB or YUV signals to an on-screen display (OSD) portion of the video processor 114. In this way, the video information selected by the viewer using the remote control unit 128 is displayed on the CRT 120.

Figure 3 shows a flowchart illustrating a process followed by the EPG

15   processor 210 in displaying history information for the episodes of the program that were previously broadcast, in accordance with present invention.

To perform the process shown in Figure 3, the audio-visual system 100 can be operated under two modes, namely, a regular mode and a standby mode. When the power is on, the television set 100 is operated under the

20   regular mode, in which the received audio and video signals can be displayed on the audio-visual system 100. When the power is off, the audio-visual system 100 is operated under the standby mode. In the standby mode, the tuner 108, host processor 126, AV switcher 110, and EPG 116 are powered by a separate portion of the main power system (not shown) in the audio-visual system 100,

25   while the audio processor 112, the video processor 114, the speaker 118, the CRT 120, the vertical and horizontal deflection 122, and the control signal receiving circuit 124 are powered off. Thus, in the standby state, the audio-visual system 100 can still perform the steps of the process shown in Figure 3, other than the display steps.

30   At step 303, upon receiving programs that are currently being broadcast from multiple channels, the tuner 108, operating under a remotely entered command from the viewer, selects one of the channels and sends the program (current program) carried in the selected channel to the AV switcher 110, the

5   host processor 126, and the EPG processor 210. From this received signal, the EPG processor 210 identifies the program. Typically a program can be identified by the associated XDS data that is sent with a program in the VBI. Also the EPG data will identify the program. Where the EPG data is from GemStar, it will contain information required to identify a program.

10   Step 304 allows for a different set of options depending on whether or not a flag for the program was set in the history log 209. The assumption is that if a flag for the program is already set in the history log 209, that the user has indicated that the program was of interest, thus he or she will likely have the same interest in the future. The flag can be set by a specific user command

15   inputted via the remote controller 128, the mere fact that a previous episode of a program was recorded by the user using the VCR 130, or that the user previously watched an episode of the program. Thus a program whose flag is already set in the history log 209 is likely to have been watched or in the case that it was missed the user would like to read about what happened in the prior

20   episode.

     At step 304, the EPG processor 210 determines whether the history log 209 contains the history information relating to the previous episode of the current program. If the history log 209 contains the history information relating to the previous episode of the current program, the operation is led to step 306.

25   If the history log 209 does not contain the history information relating to the previous episode of the current program, the EPG processor 210 goes to step 318 where it sends a control signal to cause the video processor 114 to display on the CRT 120 a prompt: "Should this program be entered into the history log?" In a standby mode, the video processor 114 will not respond to the

30   control signal, so that the prompt will not be displayed on the CRT 120.

     At step 318, in a regular mode, the EPG processor 210 awaits a response from a viewer. In response to the prompt, a viewer may select either the "Yes" or "No" key on the remote controller 128, which causes the remote controller

5   128 to send a control signal to the control signal receiving circuit 124. Upon

receiving the control signal from the control signal receiving circuit 124, the

host processor 126 sends the control signal to the EPG processor 210. If the

viewer's answer is "No", the operation is led to step 322. In a preferred

embodiment, the viewer can program the system using the remote controller

10 128, so that, in a standby mode, the EPG goes to step 322 without awaiting a

response from a viewer, since presumably the viewer can not be watching the

prompt.

If the viewer's answer is "Yes", the operation is led to step 320, where

the EPG processor 210 is instructed to make an entry for the current program in

15 the history log. At step 320, the EPG processor 210 stores the name (or

identification) of the current program into the history log 209. It should be

noted that after the viewer has selected the program at step 320, the EPG

processor 210 would remember to store the history information for all current

episodes of the program into the history log 209.

20   At step 322, the EPG processor 210 leads the operation to step 324 to

terminate the process without displaying the history information stored in the

history log 209.

At step 304, if the current program's prior episode is contained in the

history log 209, the EPG processor 210 is caused to recall prior user settings

25 and cause the video processor 114 to display on the CRT 120 a prompt to the

user to decide whether or not to change the current TV settings to prior

settings. The EPG processor 210 then proceeds to step 308.

Each time the history log 209 is viewed by the user, a bit, i.e., a flag, is

set by the CPU 210 in history log 209 so that the next time the history log 209

30 is opened, the system knows that the user has already read the information on

the previous episode, even in the case that the episode's information was

deliberately erased. At step 308 the EPG processor 210 further determines

whether the previous episode of the program was probably watched at some

5   earlier time on the audio-visual system 100 based on these bits in the history

log 209. If the previous episode of the program was displayed on the audio-

visual system 100, i.e., watched by the viewer at some earlier time, the

operation is led to step 312. If the previous episode of the program has not

been displayed on the audio-visual system 100, the EPG processor 210 sends a

10   control signal to cause the video processor 114 to display on the CRT 120 a

prompt: "Do you want to review previous episode information?" and the

operation is then led to step 310.

At step 310, in a regular mode, the EPG processor 210 awaits a response

from a viewer. In response to the prompt, a viewer selects either the "Yes" or

15   "No" key on the remote controller 128, which causes the remote controller 128

to send a control signal to the control signal receiving circuit 124. Upon

receiving the control signal from the control signal receiving circuit 124, the

host processor 126 sends the control signal to the EPG processor 210. If the

viewer's answer is "Yes", the EPG processor 210 leads the operation to step

20   314. If the viewer's answer is "No", EPG processor 210 leads the operation to

step 312.

In a standby mode, the EPG processor 210 leads the operation to step

312 without awaiting a response from a viewer at steps 308 and 310. At step

312, the EPG processor 210 stores the history information for the current

25   program episode into the history log 209. The operation is then led to step 322.

At step 322, the EPG processor 210 terminates the process without displaying

the history information stored in the history log 209 and ends the process at

step 324.

At step 314, the EPG processor 210 retrieves the history information for

30   the previous episode of the program and sends it to the OSD portion of the

video processor 114, which displays the history information on the CRT 120.

Thereafter, the process is terminated at step 324.

5   According to the present invention, the program for performing the process shown in Figure 3 can be stored in the ROM 212 and executed by the EPG processor 210.

Although the present invention has been shown and described with respect to preferred embodiments, various changes and modifications are

10   deemed to lie within the sprit and scope of the invention as claimed. The corresponding structures, materials, acts, and equivalents of all means or step plus function elements in the claims which follow are intended to include any structure, material, or acts for performing the functions in combinations with other claimed elements as specifically claimed.